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ONTARIO WATER
RESOURCES COMMISSION

ANNUAL REPORT 1965

FENELON FALLS

water treatment plant

TD
227
F46
W38
1965

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DIVISION OF PLANT OPERATIONS

Ontario Water Resources Commission

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ONTARIO WATER RESOURCES COMMISSION

OFFICE OF THE GENERAL MANAGER

Members of the Fenelon Falls Local Advisory Committee,
Village of Fenelon Falls.

Gentlemen:

I am pleased to provide you with the 1965 Annual Report for the Fenelon Falls Water Treatment Plant, OWRC Project No. 60-W-57.

We appreciate the co-operation you have extended to our Operations staff throughout the year, and trust that continuation of this close association will ensure even greater progress in the sphere of water treatment.

Yours very truly,

D. S. Caverly,
General Manager.

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assr

ONTARIO WATER RESOURCES COMMISSION

801 BAY STREET

TORONTO 5

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J. H. H. ROOT, M.P.P.
VICE-CHAIRMAN

D. S. CAVERLY
GENERAL MANAGER

W. S. MacDONNELL
COMMISSION SECRETARY

General Manager,
Ontario Water Resources Commission.

Dear Sir:

I am pleased to provide you with the 1965 Annual Report on the operation of the Fenelon Falls Water Treatment Plant, OWRC Project No. 60-W-57.

The report presents design data, outlines operating problems encountered during the year and summarizes in graphs, charts and tables all significant flow and cost data.

Yours very truly,

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

FOREWORD

This report provides useful information on the operating efficiency of this project during 1965. It is intended to act as a guide in gauging plant performance. To implement that aim, it includes detailed statistical and cost data, a description of the project and a summary of its operation during the year.

Of particular interest will be the cost data, which show the total cost to the municipality and the areas of major expenditure.

The Regional Operations Engineer is primarily responsible for the preparation of the report, and has compiled and arranged the material. He will be pleased to answer any questions regarding it. Other groups, however, were involved in the production, and these include the statistics section, the Drafting Section of the Division of Sanitary Engineering and the Division of Finance.

B. C. Palmer, P. Eng.,
Director,
Division of Plant Operations.

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FENELON FALLS
water treatment plant

operated for

THE VILLAGE OF FENELON FALLS

by the

ONTARIO WATER RESOURCES COMMISSION

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DIVISION OF PLANT OPERATIONS

DIRECTOR: B. C. Palmer

Assistant Director: C. W. Perry
Regional Supervisor: D. A. McTavish
Operations Engineer: R. Kauppinen

801 Bay Street Toronto 5

'65 REVIEW

The total operating costs increased from $6,258.23 to $7,884.37 in 1965. However, the cost per thousand gallons of raw water treated decreased from $0.22 to $0.19.

In 1965 there was a substantial increase in the raw water treated at the plant. A total of 40.73 million gallons was treated this year compared to 27.88 million gallons in 1964. This represents an increase of about 46 percent in the one year period.

The average daily flow for the year was 110,000 gallons per day. Peak flows occurred in the month of June averaging 172,000 gallons per day. Low flows as expected occurred in the winter months with the average daily flow in January being 80,000 gallons per day.

A total of 924 pounds of chlorine was used compared to 1167.5 pounds in 1964. This was a decrease in the dosage rate from 4.19 ppm in 1964 to 2.27 ppm in 1965.

A pressure sensing system was installed in the distribution system in 1965 to allow for the automatic control of the pumps.

GLOSSARY

BTU	British Thermal Unit
flocculation	bringing very small particles together to form a larger mass (the floc) before settling
fps	feet per second
gpm	gallons per minute
lin. ft.	linear feet
mgd	million gallons per day
pH	a symbol for hydrogen-ion concentration; a pH test determines the intensity of the acidity or alkalinity of a water
ppm	parts per million
ss	suspended solids
SWD	side wall depth
TDH	total dynamic head (usually refers to pressure on a pump when it is in operation)
turbidity	a measurement of the amount of visible material in suspension in water

HISTORY
1957 - 1965

INCEPTION

On August 21, 1957, the Village of Fenelon Falls and the Ontario Water Resources Commission initiated plans for the construction of a modern water treatment plant and distribution system. The consulting engineering firm of Franklin McArthur Associates Ltd. was engaged to prepare plans and specifications.

APPROVAL

In early 1961, approval was obtained from the Ontario Municipal Board for the construction of the project. In 1961, the Village signed an agreement with the Ontario Water Resources Commission to finance, construct and operate the plant.

CONSTRUCTION

H. J. McFarland Company of Picton, Ontario, was awarded the contract for the project on March 8, 1961. The Division of Plant Operations of the Ontario Water Resources Commission took over operation of the project when construction was completed on November 1, 1961.

TOTAL COST

The total capital cost of the project was $303,660.14.

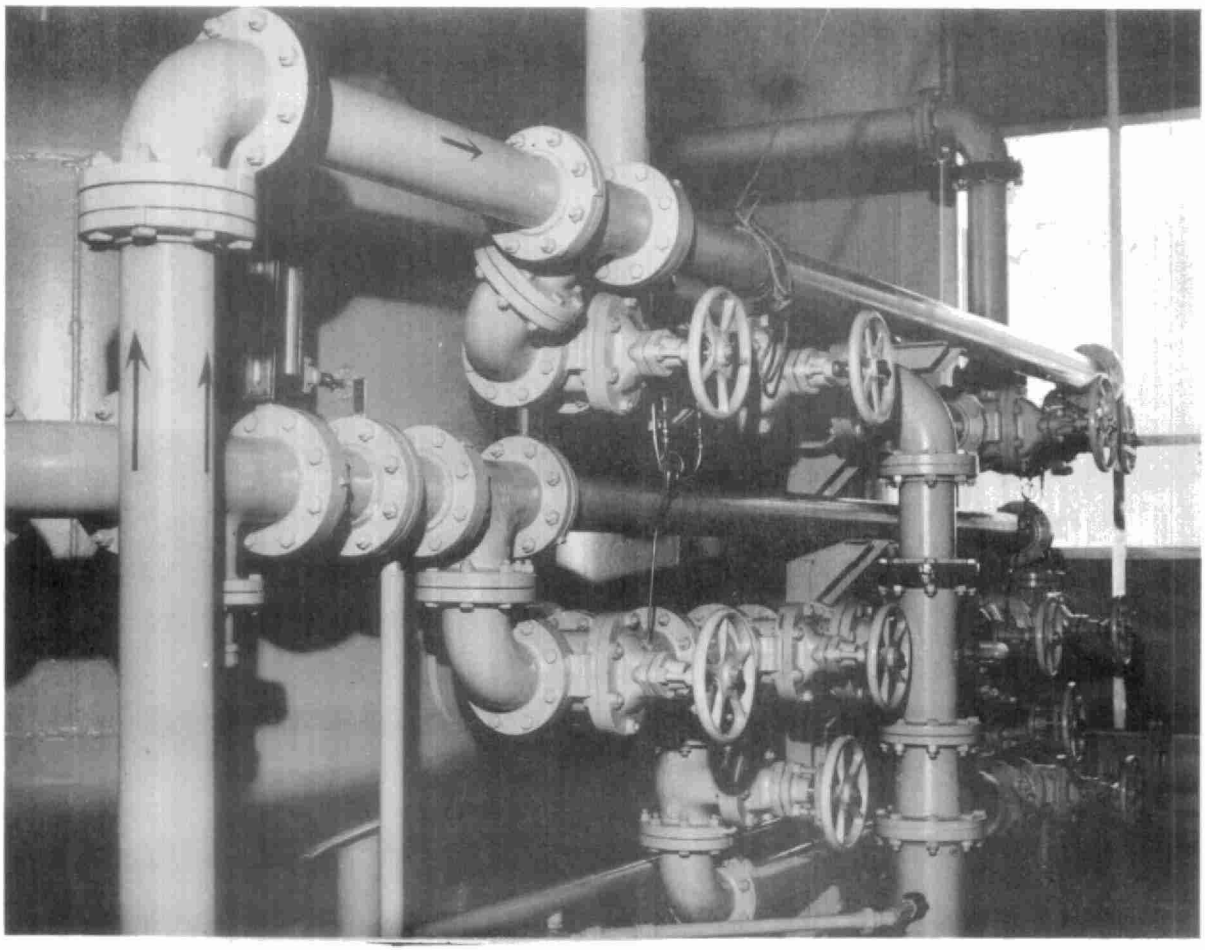


T. BRADBROOKE
CHIEF OPERATOR

Project Staff

COMMENTS

Mr. Bradbrooke has been the OWRC operator for the project since 1962. His duties consists of the maintenance of the distribution system and the operation of the Water Treatment Plant. Also, he assists the Village with service connections and watermain extensions. Casual help is employed at the project when required.



PIPING AND VALVES FOR OPERATING THE TWO PRESSURE FILTERS

Description of Project

INTAKE

The Fenelon Falls Water Treatment Plant is designed to remove coliform bacteria, algae, and turbidity from the raw water of Cameron Lake. The raw water intake structure is 710 feet off shore and at a depth of 8 feet. From this point, an 18-inch corrugated metal pipe leads to the 14,000 gallon wet well.

In the wet well, the raw water is chlorinated to destroy harmful bacteria before being pumped to the filters. A Fischer and Porter gas chlorinator feeds a chlorine disinfectant solution to the water. The chlorine dosage may be either automatically or manually controlled. When under automatic control, the dosage rate is proportional to the flow through the plant.

PRESSURE FILTERS

Duplicate electrically-driven centrifugal pumps draw the chlorinated water from the wet well and deliver it to the two pressure filters. These filters remove turbidity and algae. During a filter run, the upper layers of the filter gradually become choked with the materials removed from the water. This impedes the efficient flow of water through the filter and it must be backwashed.

Backwash water comes from a clear well which is filled from the delivery main as required. The water in the clear well has been previously filtered and chlorinated. A backwash pump forces water through the filter in a reverse direction and removes any filtered material. The wash water flows to

waste. Backwashing is done in times of low demand so that while one filter is being cleaned, the other can still supply enough flow to the system.

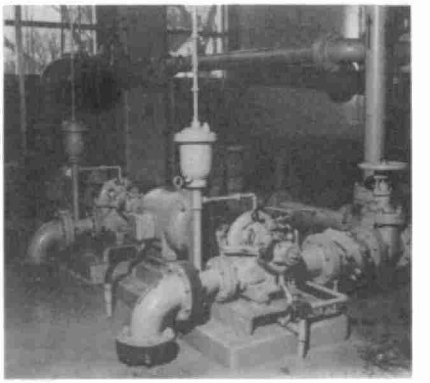
SURGE TANK

A pressurized surge tank floats on the system to reduce the rate of change of flow through the pumps and to minimize water hammer effects. No other storage is provided in the system.

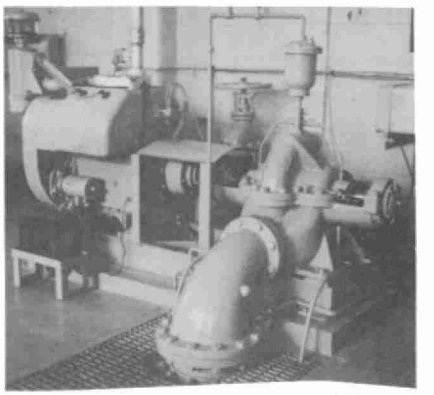
Before leaving the plant, the water passes through an orifice meter which measures the instantaneous flow. A continuous record of this flow is transferred onto a 7-day chart.

If a failure in the main duty pumps should occur, or the pressure in the system should drop to 55 psi, the standby engine and pump will start automatically. This pump is used for fire flows, or in times of power failure, and due to its high capacity, it pumps chlorinated water only, bypassing the filters.

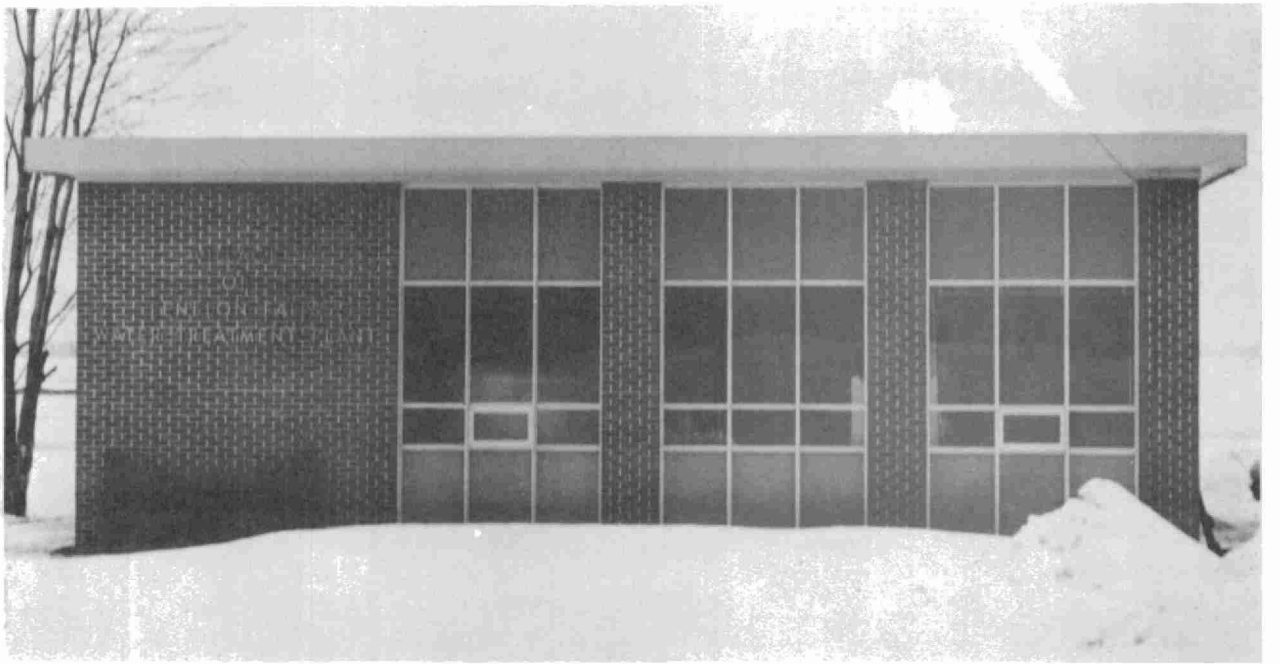
Among other equipment in the plant is an air compressor to maintain an air pressure in the surge tank, and a vacuum primer to keep all pumps primed when not in use.



TWO DOUBLE SECTION DUTY PUMPS, FOREGROUND, WITH BACKWASH PUMP IN BACKGROUND



STANDBY FIRE PUMP AND ENGINE



PROJECT COSTS

NET CAPITAL COST (Final)	$303,660.14
DEDUCT - Payments from Municipalities	2,531.00
Long Term Debt to OWRC	$301,129.14
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1965	$ 19,990.60
Net Operating	$ 7,884.37
Debt Retirement	6,077.00
Reserve	1,891.53
Interest Charged	16,895.46
TOTAL	$ 32,748.36

RESERVE ACCOUNT

Balance at January 1, 1965	$ 7,061.66
Deposited by Municipality	1,891.53
Interest Earned	352.82
	$ 9,306.01
Less Expenditures	(2,200.00)
Balance at December 31, 1965	$ 7,106.01

MONTHLY OPERATING COSTS

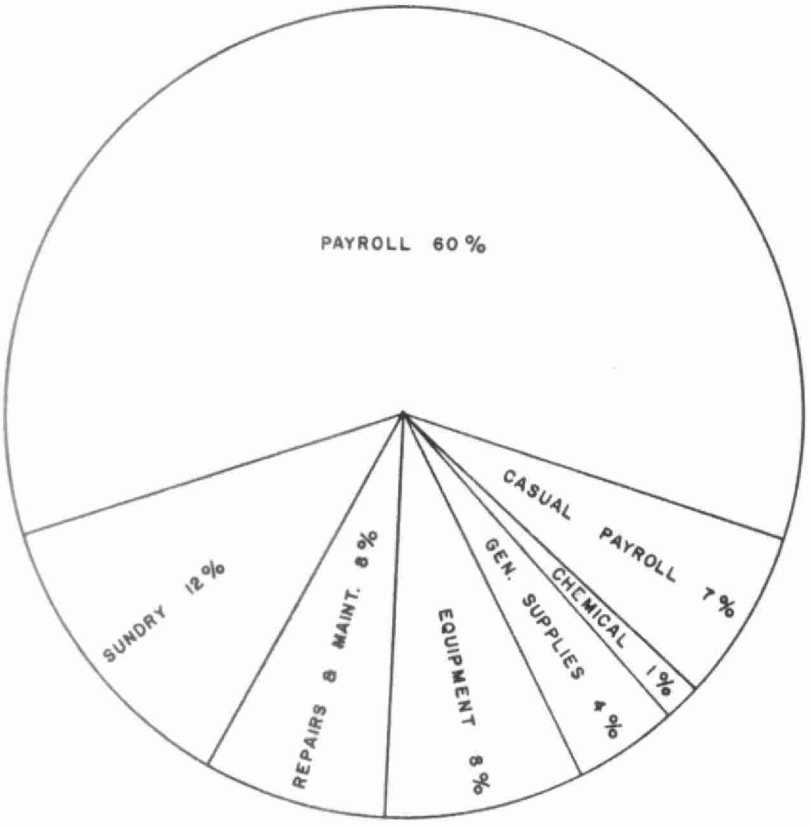
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	CHEMICAL	GENERAL SUPPLIES	EQUIPMENT	REPAIRS & MAINTENANCE	SUNDRY
JAN	543.28	307.92				206.08	13.20	16.08
FEB	535.43	372.72	65.00		33.94	18.55	15.00	30.22
MARCH	694.17	340.26	35.00		52.23	214.00	40.00	12.68
APRIL	856.40	585.79	61.25		28.53			180.83
MAY	665.39	474.75	32.50		42.25	46.41	55.00	14.48
JUNE	650.85	316.50	90.00		38.37	21.37	48.67	135.94
JULY	409.36	316.50	51.35			41.51		
AUG	511.94	316.50	36.25		20.10		25.00	114.09
SEPT	910.64	383.70	146.25		30.09		279.69	70.91
OCT	639.78	502.75	13.75				103.00	20.28
NOV	573.28	386.90	10.00	103.13	35.45		10.22	27.58
DEC	893.85	428.70			58.35	82.46		324.34
TOTAL	7884.37	4732.99	541.35	103.13	339.31	630.38	589.78	947.43

YEARLY OPERATING COSTS

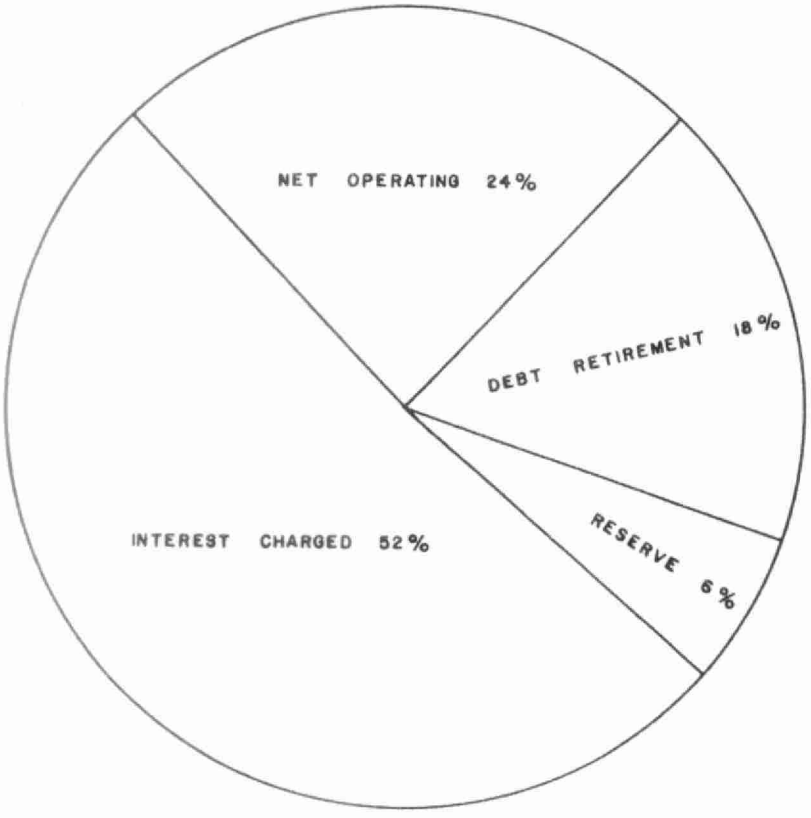
YEAR	M.G. TREATED	TOTAL COST	COST PER FAMILY PER YEAR	COST PER THOUSAND GALLONS
1964	27.881	$ 6,258.23	* $ 18.68	$ 0.22
1965	40.728	7,884.37	23.52	0.19

* BASED ON ESTIMATED ANNUAL POPULATION AND 3.9 PERSONS PER FAMILY

1965 OPERATING COSTS



TOTAL ANNUAL COST



Technical Section

Design-Data

GENERAL

Design Population - 1300 persons

Design Plant Flow - 130,000 gallons per day.

Per Capita Flow - 100 gallons per day.

Wet Well Capacity - 14,000 Imperial gallons.

Clearwell Capacity - 5800 Imperial gallons.

DUTY PUMPS

Two Allis-Chalmers double suction centrifugal pumps. Model SJH, size 2 1/2 x 2,204 USGPM at 175 ft. head, 3525 rpm.

Motors - Canadian Allis-Chalmers type ML, frame 256U, 550 volts, 3 phase, 15.0 amps., 15 hp, 3517 rpm

BACKWASH PUMP

One Canada Pump single suction centrifugal pump. Model 5CCS, close coupled drive, 612 USGPM at 40 ft. head.

Motor - Tamper type BGK-51110, 550 volts, 3 phase, 10.0 amps., 10 hp., 1735 rpm.

STANDBY AND FIRE PUMP

One Babcock-Wilcox and Goldie McCulloch single stage double suction centrifugal pump. 835 IGPM at 150 ft. head, 1750 rpm.

Drive - Wisconsin engine model VR4D, 4 1/4 inch bore, 4 1/2 inch stroke, 255 cu. in. displacement.

PUMP PRIMER

One Valve and Primer Corporation (W-APCO) automatic vacuum pump primer. Horizontal 16" x 30" vacuum storage tank. Leinman #26 - 1 1/2, 2.5 cfm. vacuum pump.

Motor - Masters 1/4 hp, single phase, 60 cycle, 110 volt, 1750 rpm., V-belt drive.

PRESSURE FILTERS

Two Infilco rapid sand pressure filters. Each filter rated at 126 Imperial gallons per minute per square foot of filter area at a pressure of 75 psi.

SURGE TANK AND COMPRESSOR

Tank capacity - 2300 U.S. gallons. Brunner air compressor, Model H30.

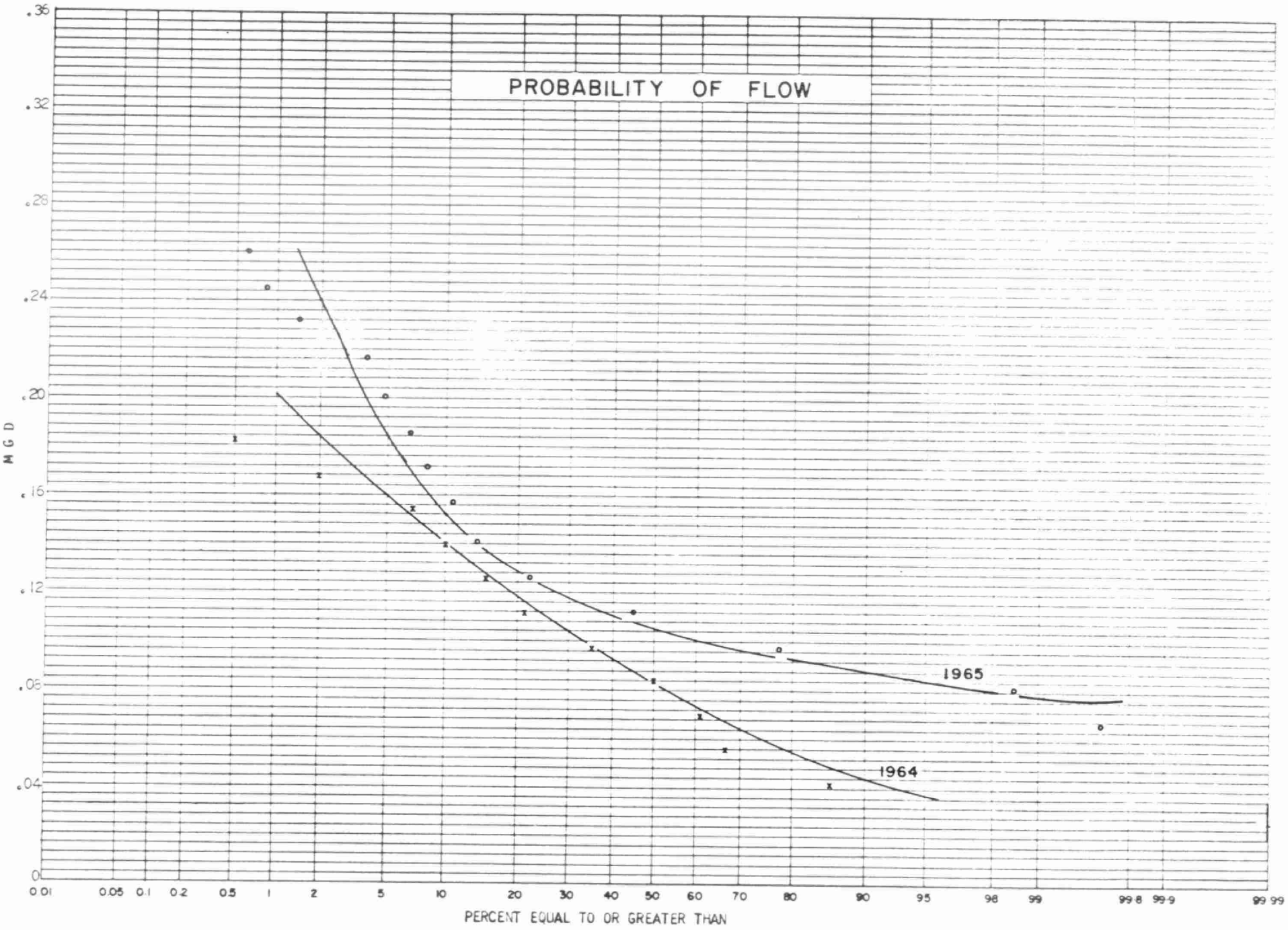
Motor - Robbins and Myers type N, frame 213, 550 volt, 3 phase, 3.5 amsp. 3 hp, 1725 rpm.

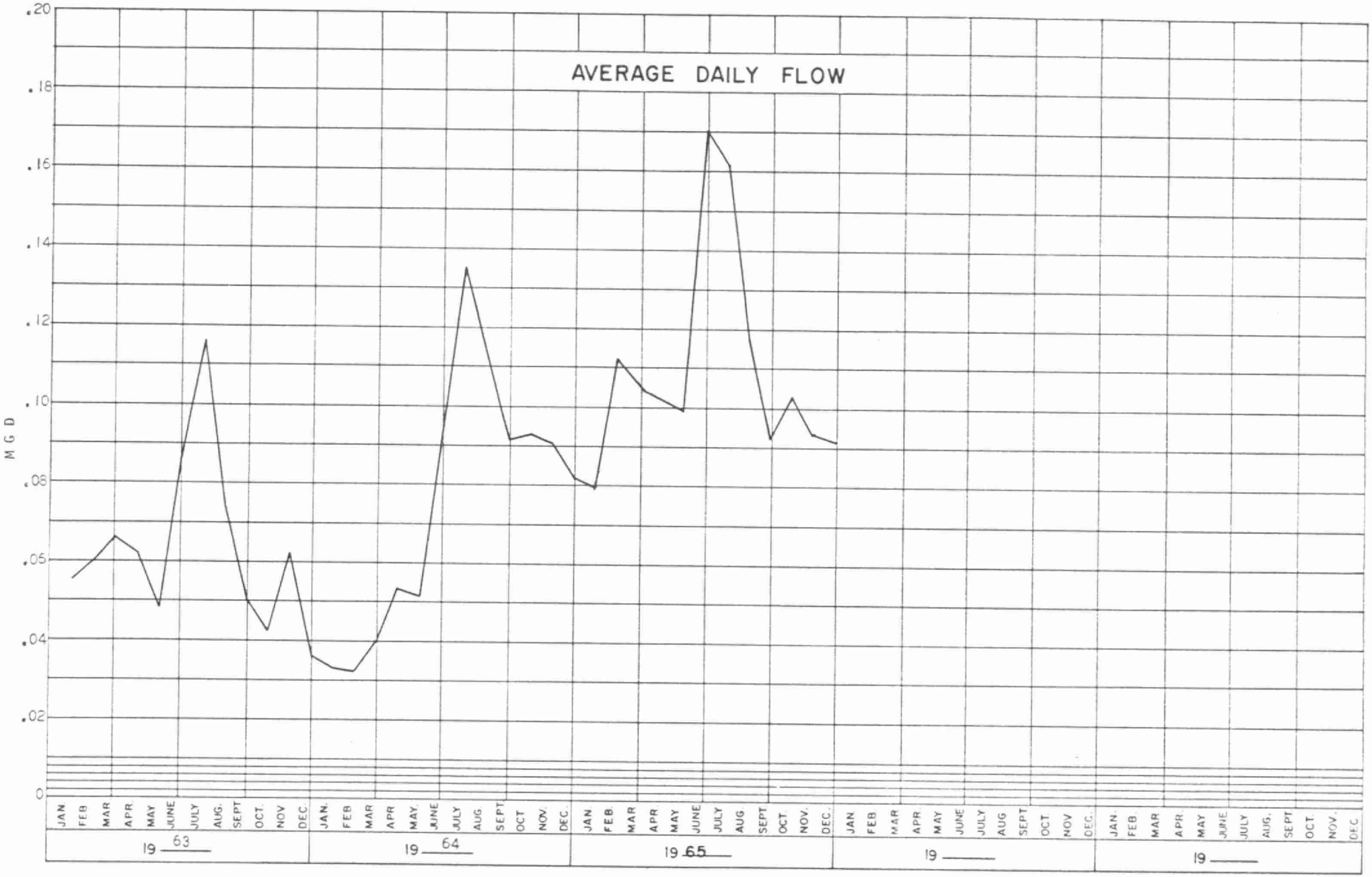
CHLORINATOR

Fischer and Porter Model C-1420. Automatic proportioning chlorinator.

Process Data

As mentioned in the Review there was a substantial increase in flow in 1965. From the probability of flow curves it may be seen that in 1964, 50% of the time the flow exceeded 83,000 gallons per day and 10% of the time the flow exceeded 140,000 gallons per day and in 1965, 50% of the time the flow exceeded 107,000 gallons per day and 10% of the time the flow exceeded 152,000 gallons per day. During high flows both pumps ran continuously.


PROBABILITY OF FLOW
.36
.32
.28
.24
.20
.16
.12
.08
.04
0
M G D
1965
1964
0.01
0.05
0.1
0.2
0.5
1
2
5
10
20
30
40
50
60
70
80
90
95
98
99
99.8
99.9
99.99
PERCENT EQUAL TO OR GREATER THAN


AVERAGE DAILY FLOW
.20
.18
.16
.14
.12
.10
.08
.05
.04
.02
0
M G D
JAN FEB MAR APR MAY JUNE JULY AUG. SEPT OCT. NOV DEC.
19 63
JAN. FEB MAR APR MAY. JUNE JULY AUG SEPT OCT NOV. DEC.
19 64
JAN FEB. MAR APR MAY JUNE JULY AUG SEPT OCT. NOV. DEC.
19 65
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC.
19
JAN. FEB. MAR APR. MAY JUNE JULY AUG. SEPT OCT. NOV. DEC
19

CHLORINATION

MONTH	PLANT FLOW (MG)	POUNDS CHLORINE	DOSAGE RATE (PPM)
JANUARY	2.480	85.0	3.43
FEBRUARY	3.161	69.0	2.18
MARCH	3.279	70.0	2.13
APRIL	3.085	70.0	2.27
MAY	3.092	93.0	3.01
JUNE	5.148	125.0	2.43
JULY	5.058	109.0	2.16
AUGUST	3.655	76.0	2.08
SEPTEMBER	2.788	55.0	1.97
OCTOBER	3.234	68.0	2.10
NOVEMBER	2.810	52.0	1.85
DECEMBER	2.938	52.0	1.77
TOTAL	40.728	924.0	-
AVERAGE	3.394	77.0	2.27

COMMENTS

A chlorine residual of 0.5 ppm was maintained in the treated water leaving the plant to insure that complete disinfection took place in the system. Bacteriological samples taken in the distribution system indicate that the disinfection has been satisfactory.

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CONCLUSIONS

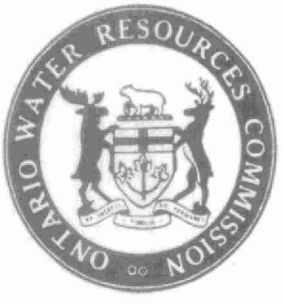
The plant has been able to supply a good quality water to the Village. However, the consumption rate of the Village is approaching the capacity of the plant during peak periods in the summer.

RECOMMENDATIONS

A study should be made of the water requirements of the Village and of the capacity of the plant to meet these requirements.

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